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BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Application Number: 09/299,965
Filing Date: April 26, 1999
Appellant(s): GEORGE ET AL.

Nancy M Lambert
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed April 13, 2005.

(1) Real Party in Interest

HL

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection is substantially correct. The changes are as follows: There were four additional grounds of rejection not identified in the appeal brief. They are as follows:

Eight Ground of Rejection

Claims 8 and 12 stand rejected under 35 USC 103(a) as purportedly unpatentable over the combined teachings of U.S. Patent 3,625,875 (Frauenglass et al), 4,239,829 (Cohen), 5,077,870 (Malbye) and any one of Alexander (US 4,155,327) Bachmann (US 3,814,156) or Pearce, Jr. (US 3,469,490).

Ninth Ground of Rejection

Claim 11 stands rejected under 35 USC 103(a) as purportedly unpatentable over the combined teachings of U.S. Patent 3,625,875 (Frauenglass et al), 4,239,829 (Cohen), 5,077,870 (Malbye) and either one of Modern Plastics Encyclopedia 1983-84 or the Admitted Prior Art.

Tenth Ground of Rejection

Claim 17 stands rejected under 35 USC 103(a) as purportedly unpatentable over the combined teachings of U.S. Patent 3,625,875 (Frauenglass et al), 4,239,829 (Cohen), 5,077,870 (Malbye) and any one of 5,196,266 (Lu et al) or 4,875,259 (Appeldorn).

Eleventh Ground of Rejection

Claims 20 and 28 stand rejected under 35 USC 103(a) as purportedly unpatentable over the combined teachings of U.S. Patent 3,625,875 (Frauenglass et al), 4,239,829 (Cohen), 5,077,870 (Malbye), any one of Alexander (US 4,155,327) Bachmann (US 3,814,156) or Pearce, Jr. (US 3,469,490) and 4,356,050 (Crivello).

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

(A) List of Evidence Relied Upon

The following is a listing of the evidence (e.g., patents, publications, Official Notice, and admitted prior art) relied upon in the rejection of claims under appeal.

3,625,875	Frauenglass et al	12-1971

4,239,829	Cohen	12-1980
4,155,327	Alexander et al	5-1979
3,814,156	Bachmann et al	6-1974
3,469,490	Pearce, Jr.	9-1969
5,077,870	Melbye et al	1-1992
4,875,259	Appeldorn	10-1989
5,196,266	Lu et al	3-1993
4,356,050	Crivello et al	10-1982

Modern Plastics Encyclopedia 1983-84, Volume 60, Number 10A, October 1983, pages 46, 48, and 53

Admitted Prior Art as characterized by the description of semi-crystalline polyester as a known polyester material for use in composite laminate.

(A) Brief Description of Evidence Relied Upon

Frauenglass et al expressly taught the mixing of an anaerobic (thermosetting) resin and a thermoplastic resin and the application of the same to the threads of a fastener in the formation of a fastening member wherein the coating was applied as a solution and the solvent dried to leave a preapplied layer on the fastener which was then ready for application.

Cohen taught that it was known to apply a slow curing epoxy resin upon a fastener component of a mechanical hook and loop fastener wherein the fastener was repositionalbe until the thermosetting epoxy resin was cured.

Alexander et al, **Bachmann et al** and **Pearce, Jr.** all taught that that as an alternative to anaerobic adhesive it was known to apply an epoxy adhesive upon a fastener for providing a permanent securing of the mechanical fastener in place.

Modern Plastics Encyclopedia 1983-84 or the **Admitted Prior Art** both suggested that those skilled in the art of thermoplastic resins would have readily understood that thermoplastic polyester material was in fact semi-crystalline (amorphous).

Melbye et al suggested that mechanical fasteners having a mushroom shape were commonplace in the art of mechanical fasteners and that the use of the mushroom shape was less expensive to manufacture than the traditional hook and loop fastener.

Either one of **Lu et al** or **Appeldorn** suggested that fasteners which were repositionalbe not only included the hook and loop type of fastener but also a fastener which included a plurality of protrusions was known wherein the protrusions mated with complementary recesses of another portion of the fastener component.

Crivello et al suggested that those skilled in the art at the time the invention was made would have utilized a functionalized thermoplastic resin (wherein the functional group associated with the thermoplastic resin was a thermosetting epoxy material) as an alternative to just an epoxy resin alone wherein the resin allowed to cure the compound with radiation rather than heat.

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-3, 7, 9, 10, 19, 20, 22, and 26 are rejected under 35 U.S.C. 102(b) as being anticipated by Frauenglass et al.

Frauenglass et al suggested that it was known at the time the invention was made to mix a thermoplastic resin and a thermosetting resin and utilize the same as an adhesive for joining mechanical fasteners permanently. More specifically, the reference taught that a combination of the mixture of a thermoplastic resin including polyester thermoplastic resins and an anaerobic thermosetting resin which was a methylacrylate resin would have been mixed together and would have been applied upon threaded components of fasteners in order to permanently secure the components together, see column 1, lines 63-column 2, line 2, column 2, lines 14-35, column 3, lines 66-75, column 5, lines 43-45, column 6, lines 49-70, column 6, line 71-column 7, line 25, and column 8, lines 13-19. The reference made it clear that the composition was storage stable for 24 hours and that the curing of the resin did not take place until one removed the oxygen from the environment in which the adhesive material was exposed. The reference additionally suggested that had one desired to speed up the cure rate of the thermosetting anaerobic resin one would have applied heat to the material, see column 7, lines 14-25. As the adhesive did not cure instantly, it would have been readily apparent that the fastener was repositionable (even when solid surfaces were being assembled together with the fastener). Additionally, note that the anaerobic adhesive did not set until the oxygen was removed and thus the fastener component when used to join porous materials (wherein there would still be air present) would have been repositionable until exposed to a vacuum environment where the air was removed from

the porous assembly. It should be noted that the reference suggested that the reference suggested that the adhesive would have been useful for nuts, bolts, screws or other threaded mechanical fasteners.

The claims at hand do not exclude a metal fastener which incorporated a coating of the specified curable polymer of Frauenglass et al thereon. Note that Frauenglass et al suggested that the coating was preapplied to the fastener and as such would have clearly suggested that one skilled in the art provide a fastener which was fabricated from a curable material. Such preapplication would have provided a surface coating on the parts, see column 6, lines 59-70, for example. Note that the language presented in the claim is open claim language and applicant has failed to state that the fastener consisted of a curable material or that it was fabricated only from a curable material. One reading the claim would have understood that application of a coating of the material upon the surface of the fastener would have resulted in a fastener comprising a fastener of metal and curable composition thereon as a fastening component.

Regarding claims 2 and 3, the reference suggested that the curable material was storage stable for a long period of time and one skilled in the art would have expected that the material would have been stable for a month. It is not until one removes the air that the resin cures. Regarding claim 7, the reference suggested the specific materials recited for use as the thermosetting component. Regarding claims 9 and 10, note that the thermoplastic materials included in the composition included polyester. Regarding claim 19, the reference clearly suggested the cured assembly after installation. Regarding claim 20, it is not seen how radiation curing the adhesive would have

resulted in a materially different end product and therefore it is deemed that the reference anticipates the claim (i.e. how is the article altered by reciting that the adhesive was cured with UV radiation). Regarding claim 22, the reference suggested the specified method of attaching the fastener together followed by curing the resin. Regarding claim 26, note the discussion above regarding the fastener including the coating thereon as providing a fastener which is at least partially fabricated from curable material.

Claims 1-3, 7, 9, 10, 13, 16, and 18-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen.

Cohen taught that it was known at the time the invention was made to apply a slow curing thermosetting adhesive upon the two components of a hook and loop type mechanical fastener wherein the fastener would have been useful for joining items together once assembled. The fastener was repositionable until the thermosetting resin was cured. The reference suggested that suitable adhesive useful for the operation included epoxy resins wherein a catalyst was incorporated in the composition to facilitate the cure of the resin. The reference failed to expressly suggest that one skilled in the art would have incorporated a thermoplastic resin in combination with this slow curing epoxy resin for the fastener.

Frauenglass et al suggested that as an alternative to an epoxy resin one skilled in the art would have selected a thermosetting composition for the mechanical fastener (note that a hook and loop arrangement would have been understood to be a

mechanical fastener) which included a mixture of a thermoplastic compound and a thermosetting anaerobic resin. The appellant is more specifically referred to column 1, lines 21-38 where the encapsulation of two part epoxy resins and their use as an adhesive is discussed by Frauenglass et al. Frauenglass et al chose to select a blend of an anaerobic resin and a thermoplastic polyester resin as an alternative to this two part epoxy adhesive arrangement. Note as discussed above, the adhesive composition of Frauenglass et al was useful for application onto the threaded components of fasteners. The appellant is referred above for a complete discussion of the reference to Frauenglass et al. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the adhesive composition of Frauenglass et al (as the use of anaerobic resin and thermoplastic resin is less cumbersome and the reduction in the risk of loss of capsules as well as loss of adhesion due to premature rupture of the encapsulated components of the epoxy resin) in the process of Cohen for making a mechanical fastener for attaching substrates together.

Alternatively, it should be noted that the reference to Frauenglass et al suggested that those versed in the art would have understood that the adhesive was useful of any number of various fasteners and not just threaded members like screws and/or bolts. The reference to Cohen clearly suggested that the incorporation of a permanent type of setting adhesive in combination with a repositionalbe mechanical hook and loop type fastener was desirable at the time the invention was made. It would have been obvious to one of ordinary skill in the art at the time the invention was made to employ the mechanical fastener of Cohen as the fastening component in Frauenglass et al when

manufacturing a fastener which incorporated an adhesive coating therein for permanent attachment after curing of the adhesive composition.

Regarding claims 2 and 3, the reference to Frauenglass et al suggested that the curable material was storage stable for a long period of time and one skilled in the art would have expected that the material would have been stable for a month. It is not until one removes the air that the resin cures. Regarding claim 7, the reference to Frauenglass et al suggested the specific materials recited for use as the thermosetting component. Regarding claims 9 and 10, note that the thermoplastic materials included in the composition of Frauenglass et al included polyester. Regarding claim 13, note that Cohen suggested that one would have provided a plurality of fasteners on a backing in the manufacture of a hook and loop type fastener. Regarding claim 16, note that the reference to Cohen suggested a hook and loop fastener. Regarding claim 18, it is not seen how the technique used to form the fastener of Cohen would have materially affected the finished product (i.e. how do these process limitations further limit the claimed article of manufacture). Regarding claim 19, the reference to Frauenglass clearly suggested the cured assembly after installation. Regarding claim 20, it is not seen how radiation curing the adhesive would have resulted in a materially different end product and therefore it is deemed that the reference meets the requirements of the claim (i.e. how is the article altered by reciting that the adhesive was cured with UV radiation). Regarding claim 21, note that the reference employed the same kind of polymer for the adhesive and one skilled in the art would have therefore expected that the finished assembly would have had the specified strength. Regarding claim 22, the

reference suggested the specified method of attaching the fastener together followed by curing the resin. Regarding claim 23 –25, note that Cohen suggested this arrangement for the fastener wherein the fastener was associated with a substrate. Regarding claim 26, note the discussion above regarding the fastener including the coating thereon as providing a fastener which is at least partially fabricated from curable material. Regarding claim 27, the reference to Cohen suggested coating both fastening surfaces.

Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Frauenglass et al and Cohen as set forth above further taken with any one of Alexander et al, Bachmann et al or Pearce, Jr.

While the reference to Frauenglass et al suggested the overall adhesive composition which was useful as an alternative to an encapsulated epoxy resin (and Cohen suggested the use of an epoxy resin in conjunction with the fastener), the reference failed to teach that one would have recognized that an epoxy resin would have been an alternative material to the anaerobic adhesive material in the operation (where the thermosetting resin was mixed with the thermoplastic resin). However, in the art of applying adhesive to mechanical fasteners, it was known per se to apply as an alternative to an anaerobic adhesive an epoxy adhesive material as evidenced by any one of Alexander et al (column 4, lines 29-36) or Bachmann et al (column 3, line 47-column 4, line 17), or Pearce, Jr. (column 4, lines 23-46). The references to any one of Alexander et al, or Bachmann et al, or Pearce, Jr. suggested that those skilled in the art would have recognized that for permanently securing mechanical fasteners together one skilled in the at would have found that the epoxy resins would have been a

functionally equivalent alternate expedient to anaerobic adhesive materials. Where, as here, two equivalents are known for their desired function, an express suggestion of the desirability of the substitution of one for the other is not needed to render such substitution obvious, see In re Fout, 213 USPQ 532, In re Siebentritt, 152 USPQ 618. Because it was an art recognized equivalent to anaerobic thermosetting adhesive materials, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the epoxy adhesive for the anaerobic adhesive as suggested by any one of Alexander et al, Bachmann et al or Pearce, Jr. in the process and mechanical fastener as set forth above by the combined teachings of Frauenglass et al and Cohen.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Frauenglass et al and Cohen as set forth above further taken the Modern Plastics Encyclopedia 1983-84 or the Admitted Prior Art.

While the reference to Frauenglass et al suggested that those skilled in the art at the time the invention was made would have incorporated a thermoplastic polyester for the thermoplastic component of the adhesive, there is no express teaching that the polyester employed therein was amorphous (semi-crystalline) as defined. The appellant is advised, however, that those skilled in the art at the time the invention was made would have known that semi-crystalline polyester material were available as polyester material for use in composite laminate as suggested by the Encyclopedia of Modern Plastics and the Admitted Prior Art. The appellant is advised that both suggested the existence of semi-crystalline polyesters as a useful thermoplastic polyester material.

More specifically, the Admitted Prior Art at page 18, line 28-page 19, line 3 where the appellant expressly suggested that semicrystalline polyesters were commercially available. Additionally, the reference Modern Plastics Encyclopedia expressly states that thermoplastic copolyesters were known to have been amorphous. Additionally, because the reference to Frauenglass et al suggested the use of thermoplastic polyesters, it certainly would have been within the purview of the ordinary artisan to test and select a suitable thermoplastic polyester material for use in the above mentioned fastener system. It would have been obvious to select a suitable polyester material including those known polyesters which were amorphous as suggested by the Encyclopedia of Modern Plastics 1983-84 and the Admitted Prior Art in the mechanical fasteners as set forth by the combination of Frauenglass et al and Cohen.

Claims 1-3, 7, 9, 10, 13, 14, 16 and 18-27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen either of which is further taken with Melbye et al.

The rejection of the claims over the combined teachings of Cohen and Frauenglass et al is discussed at length above and appellant is referred to the same for a complete discussion of the rejection. It is clear from the discussion above that the claims at hand do NOT require that the fastener be completely fabricated from the thermoplastic and thermosetting (curable) materials. However, it should be noted that the reference to Cohen suggested that a suitable fastener component with a thermosetting coating thereon would have included a hook and loop type fastener. The reference did not state that the hook and loop fastener material was formed from a

thermoplastic material. However, having a fastener component formed from a thermoplastic material would satisfy the claim as presented (assuming that the claim is requiring that the fastener be formed completely of the polymeric material wherein the polymeric material included both a thermoplastic and a curable component) in that the core of the fastening component would have been thermoplastic and the exterior of the component would have a coating of a mixture of a thermoset and a thermoplastic material as envisioned by Frauenglass.

Those skilled in the art at the time the invention was made would have known to incorporate a fastener which replaced a hook and loop type fastener component with a mushroom shaped fastener component wherein the component was completely formed from thermoplastic with a backing and the mushroom shaped component attached to the same as evidenced by Melbye et al. More specifically, Melbye suggested that the specific mushroom configuration was a suitable substitute for the hook and loop configuration of Cohen. Additionally, the fastener was formed completely from thermoplastic material. Application of the thermosettable coating of material on the thermoplastic fastener would have resulted in a fastener which was completely fabricated from thermoplastic and thermosettable (curable) materials. As it was an art recognized alternative to employ a thermoplastic fastener as an alternative to a hook and loop fastener, it would have been obvious to one of ordinary skill in the art at the time the invention was made to incorporate the fastener of Melbye in the fastener of Cohen wherein the fastener component was coated with a curable thermosetting material such as that of Frauenglass et al. Note additionally that Melbye suggested that

the processing utilized to manufacture the fastener from thermoplastic having the mushroom shapes therein was more cost efficient than forming the fastener as a hook and loop fastener assembly. Appellant is referred to the rejections above for a complete discussion of the dependent claims.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Frauenglass et al and Cohen further taken with either one of Lu et al or Appeldorn.

While the reference to Cohen suggested that those skilled in the art at the time the invention was made would have incorporated a hook and loop fastener component for the mechanical fastener, other repositionable fasteners were known to the artisan as an alternative type of fastener for mechanical fasteners which included those containing protrusions which were mated with recesses in the complementary component of the fastener as evidenced by Lu et al or Appeldorn. More specifically each of Appeldorn or Lu et al suggested that those skilled in the art at the time the invention was made would have incorporated a fastener component which included a recessed component which mated with a protruding component and suggested that this arrangement for a fastener would have been an alternative construction for the fastener to the hook and loop arrangement of Cohen. Because it would have been viewed as a functionally equivalent alternate expedient to the use of a hook and loop fastener arrangement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the arrangement of protruding components which were mated with complementary recessed components of another fastener component in place of the

hook and loop arrangement of Cohen in the mechanically attached adhesive fastener as taught by the combined teachings of Frauenglass et al and Cohen.

Claims 20 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combined teachings of Frauenglass et al and Cohen and any one of Alexander et al, Bachmann et al or Pearce, Jr. as set forth above further taken with Crivello et al.

The references as set forth above suggested that those skilled in the art at the time the invention was made would have incorporated an epoxy resin for the thermosetting component, however they failed to teach the use of a functionalized thermoplastic (wherein the functional groups associated with the thermoplastic were thermosetting groups like epoxy). Additionally, there is no disclosure of the use of radiation to cure the resin employed in the operation. However, one skilled in the art of resin formulation would have known that as an alternative to epoxy resins one would have suitably employed a functionalized thermoplastic wherein the functional group associated with the resin included a thermosetting resin as evidenced by Crivello et al. the reference to Crivello additionally suggested that the resins would have been cured with radiation curing once the assembly was set in the desired position. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Crivello as an alternative to use of an epoxy resin alone as such would have afforded one the ability to cure the material with radiation (rather than just either having to apply heat or wait until the resin had hardened) in the operation of making a fastener component as set forth above by the combined teachings of

Frauenglass et al and Cohen and any one of Alexander et al, Bachmann et al or Pearce, Jr.

Claims 8 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen either of which is further taken with Melbye et al and further taken with any one of Alexander et al, Bachman et al, or Pearce, Jr.

The combination of Cohen, Frauenglass and Melbye have been discussed at length above and appellant is referred to the same for a complete discussion of the combination. While the reference to Frauenglass et al suggested the overall adhesive composition which was useful as an alternative to an encapsulated epoxy resin (and Cohen suggested the use of an epoxy resin in conjunction with the fastener), the reference failed to teach that one would have recognized that an epoxy resin would have been an alternative material to the anaerobic adhesive material in the operation (where the thermosetting resin was mixed with the thermoplastic resin). Thus the references as set forth above failed to teach that one skilled in the art would have selected an epoxy resin for the curable component rather than the anaerobic adhesive of Frauenglass et al. However, in the art of applying adhesive to mechanical fasteners, it was known per se to apply as an alternative to an anaerobic adhesive an epoxy adhesive material as evidenced by any one of Alexander et al (column 4, lines 29-36) or Bachmann et al (column 3, line 47-column 4, line 17), or Pearce, Jr. (column 4, lines 23-46). The references to any one of Alexander et al, or Bachmann et al, or Pearce, Jr. suggested that those skilled in the art would have recognized that for permanently

securing mechanical fasteners together one skilled in the at would have found that the epoxy resins would have been a functionally equivalent alternate expedient to anaerobic adhesive materials. Because it was an art recognized equivalent to anaerobic thermosetting adhesive materials, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the epoxy adhesive for the anaerobic adhesive as suggested by any one of Alexander et al, Bachmann et al or Pearce, Jr. in the process and mechanical fastener as set forth above by the combined teachings of Cohen, Frauenglass et al and Melbye et al.

Claim 11 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen either of which is further taken with Melbye et al and further taken with either one of Modern Plastics Encyclopedia 1983-84 or the Admitted Prior Art.

The combination of Cohen, Frauenglass and Melbye have been discussed at length above and appellant is referred to the same for a complete discussion of the combination. While the reference to Frauenglass et al suggested that those skilled in the art at the time the invention was made would have incorporated a thermoplastic polyester for the thermoplastic component of the adhesive, there is no express teaching that the polyester employed therein was amorphous (semi-crystalline) as defined. Thus the combination failed to meet the requirement of an amorphous polyester material. The appellant is advised, however, that those skilled in the art at the time the invention was made would have known that semi-crystalline polyester material were available as polyester material for use in composite laminate as suggested by the Encyclopedia of

Modern Plastics and the admitted prior art. The appellant is advised that both suggested the existence of semi-crystalline polyesters as a useful thermoplastic polyester material. Additionally, because the reference to Frauenglass et al suggested the use of thermoplastic polyesters, it certainly would have been within the purview of the ordinary artisan to test and select a suitable thermoplastic polyester material for use in the above mentioned fastener system. It would have been obvious to select a suitable polyester material including those known polyesters which were amorphous as suggested by the Encyclopedia of Modern Plastics 1983-84 and the admitted prior art in the mechanical fasteners as set forth by the combined teachings of Cohen, Frauenglass et al and Melbye.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen either of which is further taken with Melbye et al and further taken with either one of Lu et al or Appeldorn.

The combined teachings of Cohen, Frauenglass et al and Melbye are discussed above and appellant is referred to the same for a complete discussion of these references. While the reference to Cohen suggested that those skilled in the art at the time the invention was made would have incorporated a hook and loop fastener component for the mechanical fastener, other repositionable fasteners were known to the artisan as an alternative type of fastener for mechanical fasteners which included those containing protrusions which were mated with recesses in the complementary component of the fastener as evidenced by Lu et al or Appeldorn. Note that the

reference to Melbye suggested one alternative form of the fastener which included the mushroom configuration. To employ a different configuration would have been within the purview of the ordinary artisan as an alternative to the hook and loop arrangements. More specifically each of Appeldorn or Lu et al suggested that those skilled in the art at the time the invention was made would have incorporated a fastener component which included a recessed component which mated with a protruding component and suggested that this arrangement for a fastener would have been an alternative construction for the fastener to the hook and loop arrangement of Cohen. Because it would have been viewed as a functionally equivalent alternate expedient to the use of a hook and loop fastener arrangement, it would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the arrangement of protruding components which were mated with complementary recessed components of another fastener component in place of the hook and loop arrangement of Cohen and Melbye in the mechanically attached adhesive fastener as set forth above by the combined teachings of Cohen, Frauenglass et al and Melbye.

Claims 20 and 28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Cohen in view of Frauenglass et al or alternatively Frauenglass et al in view of Cohen either of which is further taken with Melbye et al and further taken with any one of Alexander et al, Bachman et al, or Pearce, Jr. and further taken with Crivello et al.

Appellant is referred to the discussion above regarding the combined teachings of Cohen, Frauenglass, Melbye, and any one of Alexander et al, Bachman et al, or Pearce, Jr. The references as set forth above suggested that those skilled in the art at

the time the invention was made would have incorporated an epoxy resin for the thermosetting component, however they failed to teach the use of a functionalized thermoplastic (wherein the functional groups associated with the thermoplastic were thermosetting groups like epoxy). Additionally, there is no disclosure of the use of radiation to cure the resin employed in the operation. However, one skilled in the art of resin formulation would have known that as an alternative to epoxy resins one would have suitably employed a functionalized thermoplastic wherein the functional group associated with the resin included a thermosetting resin as evidenced by Crivello et al. the reference to Crivello additionally suggested that the resins would have been cured with radiation curing once the assembly was set in the desired position. It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize the teachings of Crivello as an alternative to use of an epoxy resin alone as such would have afforded one the ability to cure the material with radiation (rather than just either having to apply heat or wait until the resin had hardened) in the operation of making a fastener component as set forth above by the combined teachings of Cohen, Frauenglass, Melbye, and any one of Alexander et al, Bachman et al, or Pearce, Jr.

(10) Response to Argument

Appellant initially addresses the rejection of the claims under 35 USC 102(b) and the reference to Frauenglass et al and initially notes that to anticipate a claim, the reference must teach every element of the claim. This is agreed with and as clearly pointed out above and as discussed in detail below, it is believed that the reference to Frauenglass clearly taught each and every component of the claimed invention. It is

correct to state that Frauenglass et al provided a mixture of a thermoplastic resin (like a polyester resin) and an anaerobic resin which was applied upon threaded components (including threaded fasteners) in order to secure the components together. It is additionally correct that the reference suggested that the material was applied as a coating which was deposited upon the threads of the fastener. Appellant then concludes that as a result, "the fastener is not fabricated from the thermoplastic polymer/adhesive mixture". This argument is respectfully traversed.

As noted above as well as in the Final rejection, the claims at hand employ "open" claim language and do not exclude the use of a metal component as part of the "curable mechanical fastener". Additionally, as previously pointed out to appellant, the reference to Frauenglass et al preapplied the solution of thermoplastic resin and anaerobic adhesive upon the threaded members and then dried the coating to provide the fastener component which was then supplied to the user who then could use the same. The applied coating was clearly intended to be part of the fastening assembly and an integral part of the fastener. As such, the fastener was clearly fabricated from the thermoplastic polymer/ anaerobic adhesive mixture. It should be pointed out that the appellant has been presented with this line of reasoning previously and has failed to address the same and that appellant was advised that the claimed article of manufacture did not state that the fastener "consisted of" the thermoplastic resin and thermosetting resin mixture nor does it state that it was manufactured from only the thermoplastic resin and thermosetting resin mixture. The appellant has not amended the claims to limit the same to being made only of the resinous mixture (as previously

advised), and thus it is readily apparent that the claims at hand employ "open" claim language and do not exclude the use of the metal component within and as part of the fastener system. Additionally, there is no requirement in the claims which excludes the use of a coating as a layer disposed on the surface of the fastener (which is part of the fastener when in use). Appellant's argument regarding the fastener not being fabricated from the mixture of thermoplastic polymer/adhesive mixture is not persuasive.

The appellant additionally argues that the reference to Frauenglass failed to disclose a fastener repeatedly attached and unattached and notes that the anaerobic adhesives polymerize when air is removed from their presence. The appellant notes that the adhesive is particularly suited for bonding metals and other nonporous materials because they effectively exclude atmospheric oxygen from contact with the adhesive, and therefore the adhesive polymerizes to bond the surfaces together. The appellant concludes that the screw of Frauenglass would not be repeatedly attachable and unattachable. This again is not persuasive.

First regarding this argument, appellant is advised that the claims at hand are article of manufacture claims and not a method of use claim. The method of use claims merely require the mating of the fastening surfaces and the curing of the thermosetting component of the resin and do not recite repeated attachment and unattachment of the components. As such, appellant is advised that the thermosetting material employed by Frauenglass et al is one of the same materials recited by appellant in claim 7, namely methacrylate, see column 2, lines 28-32, column 2, line 70-column 3, line 5 of Frauenglass et al. Clearly as the reference suggested the use of the same composition

for the thermosetting material it must have also been capable of being repositioned (attached and unattached) as argued by appellant.

Second regarding this argument, the appellant is advised that the fastener of Frauenglass et al would not have cured immediately, but rather it may have been desirable to speed up the curing operation with the application of heat to the assembly, see column 6, lines 14-21. As such, while the adhesive would cure at room temperature, the speed of the curing could be increased by increasing the temperature in order to promote the polymerization. The appellant is advised as such, that the curing of the resin employed in Frauenglass et al was clearly not instantaneous as appellant would lead one to believe and the curing rate would have allowed one to reposition (attach and unattach) the fastener prior to completion of the curing of the resin.

Lastly regarding appellant's argument that the fastener is not repositionable, the appellant is advised that this again is a function of the material being bonded together and if the surfaces being bound together were porous (i.e. allowed for contact between air and the adhesive), the adhesive would not begin to cure until the assembly was subjected to a vacuum (i.e. the removal of air). Under these circumstances, the fastener with the adhesive coating thereon as preapplied by Frauenglass would have been capable of being positioned and repositioned (i.e. attached and unattached) as many times as desired until such time that the assembly was to be subjected to vacuum. The argument presented by appellant regarding the repeatedly attaching and unattaching is therefore not persuasive.

The appellant also noted regarding the reference to Frauenglass et al that the reference failed to teach a combination of a thermosettable composition and a thermoplastic composition as the curable material and that in more particular the reference failed to teach a thermosettable composition as appellant in their specification defined a thermosettable composition as "one which can be cured (i.e. crosslinked), for example by exposure to, preferably, thermal radiation (although exposure to actinic radiation, moisture, or other means may also suffice) to yield a substantially infusible (i.e. thermoset) material." (page 12, lines 23-27 of the specification). The appellant argues that because the reference to Frauenglass et al does not cure the anaerobic resin with radiation or heat it does not satisfy the requirements of a thermosetting resin according to the invention as is claimed. This argument is not persuasive.

It should be noted that an analysis of the language referred to in the specification is not so concise as to define a thermosetting resin as one which was cured (crosslinked) only with the use of thermal or actinic radiation or moisture exposure. More specifically, the specification stated that the thermosetting material is one which was cured (note that the anaerobic resin in Frauenglass et al was clearly cured, see column 2, lines 14-16, column 7, lines 14-22). This is clear from the portion of the specification referred to by appellant. The portion referred to, however, does NOT require that the curing and/or cross-linking take place as a function of exposure to thermal radiation or actinic radiation as it states "for example by exposure to, preferably, thermal radiation (although exposure to actinic radiation, moisture, or other means may also suffice)", emphasis added. As such, the language merely requires that the

thermosetting resin be one which is crosslinked and/or cured to yield a substantially infusible material. The mechanism for curing could be heat, actinic radiation or other means. The reference to Frauenglass et al taught both the use of heat as well as "other means" as the reference expressly stated:

> "While curing will take place at room temperature and in the absence of accelerators, the time required to achieve adhesive bonding can be shortened by subjecting the assembly containing the adhesive thermoplastic product to moderate temperatures, such as from about 125° F. to about 250° F., or by treating the adhesive or one or more of the surface to be bonded with a polymerization accelerator immediately before the assembly operation." (emphasis added).

The reference to Frauenglass et al also stated that the curing mechanism was the removal of the oxygen which triggers the curing of the resin. As such the reference not only taught other means as the addition of an accelerator but also taught the removal of oxygen as another means useful for curing the resin. Note that the portion referred to above also expressly stated that the curing would have taken place with the addition of heat to the system.

For the reasons expressed above, it is believed that the rejection under 35 USC 102(b) should be sustained.

Regarding the rejection under 35 USC 103 and the combination of Cohen and Frauenglass et al, the appellant argues that the reference to Cohen discloses a hook and loop fastener arrangement with the use of a slow curing epoxy resin and a curing catalyst (i.e. a thermosetting composition) and that the reference failed to teach the inclusion of a thermoplastic material with the thermosetting material. Appellant also argues that there is no support for the examiner's conclusion which can be found in

either Cohen or Frauenglass to employ the composition of Frauenglass in the hook and loop fastener arrangement of Cohen which teaching or suggestion must be provided in order to establish a prima facie case.

It is agreed that the reference to Cohen suggested that those skilled in the art would have known to employ a slow curing epoxy resin for the mechanical fastener assembly disclosed therein (the hook and loop fastener). The appellant is advised, however, that the reference to Frauenglass did expressly state that it was desirable not to utilize a thermosetting resin based upon a two part epoxy resin system as such typically required encapsulation and such systems were difficult to handle and could have rupture of the encapsulation prematurely. As such, the reference to Frauenglass et al stated that it was preferable to utilize the combination of the polyester thermoplastic material and the anaerobic adhesive as the binder for the fasteners. As both Cohen and Frauenglass et al are applying a curable thermosetting binder to a fastener to provide a means ultimately of permanently attachment of the fastener components, one would have reasonably expected that the use of the thermoplastic and anaerobic adhesive mixture of Frauenglass et al would have been successful in Cohen when utilized in place of the epoxy resin system of Cohen. Additionally, as noted above, the reference to Frauenglass appeared to suggest that the mixture of thermoplastic resin and anaerobic adhesive would have been useful for application upon any kind of fastener and that any two surfaces to be joined together would have been suitable for the mixture for application thereto, see column 6, lines 50-55. As the reference to Cohen clearly indicated that surfaces of the hook and loop fastener were destined to be affixed or

positioned in a specific place or configuration. The appellant is therefore advised that as Cohen applied the adhesive to the fastener therein, it would have been an obvious fastener arrangement for the processing in Frauenglass et al. One would have reasonably expected that the use of the fastener of Cohen in Frauenglass et al would have functioned as one skilled in the art was well aware of how mechanical hook and loop fasteners operated. Appellant is advised that where, as here, the use of the mechanical fastener system of Cohen was an art recognized alternative fastener arrangement to that of Frauenglass et al, an express teaching or suggestion of the substitution of one for the other is not needed to render such substitution obvious, see In re Fout, 213 USPQ 532, In re Siebentritt, 152 USPQ 618. Appellant's argument that there is no reason provided for making the combination (i.e. motivation for making the combination) is not persuasive and additionally as expressed above one would have reasonably expected that the modifications as suggested would have achieved success for the reasons identified.

The appellant argues that there is no reason to substitute the anaerobic adhesive of Frauenglass et al (presumably only the anaerobic adhesive as argued by appellant) in the fastener arrangement of Cohen. As expressed above, there is ample reason to employ the combination of the thermoplastic resin and anaerobic adhesive in place of the epoxy resin of Cohen such as the ease of application (no need to encapsulate the resin) and the reduced risk associated with premature rupture and cure of the adhesive (which are both discussed by Frauenglass et al). Appellant is advised one skilled in the art viewing the prior art as a whole would have known to apply the thermoplastic and

anaerobic adhesive mixture of Frauenglass et al in the system of Cohen in place of the slow curing epoxy.

The appellant also argues that neither one of Cohen or Frauenglass taught that one skilled in the art would have fabricated the fastener from the combination of thermoplastic and thermosetting resin therein. The appellant is advised that in Frauenglass the application of the coating with the removal of the solvent therein was for the reapplication of the material to the fastener in the manufacture (fabrication) of the fastener component therein. As such, the reference to Frauenglass et al did in fact fabricate the fastener from a combination of thermoplastic and thermosetting resin. The appellant is referred to the arguments addressed above relating to Frauenglass et al as to why one skilled in the art would have understood that the reference taught that the fastener was "fabricated" from the mixture of thermoplastic resin and thermosetting resin. Again, appellant is advised that the language of the claim is "open" and that the term "fabricated" does not exclude the use of metal or other components in the fastener. The fastener must be fabricated at least in part from the mixture of thermoplastic and thermosetting material. The reference to Frauenglass clearly suggested the same and as such it is believed that a prima facie case has been established.

Regarding appellant's arguments relating to the Third to the Seventh Ground of Rejection, the appellant merely states that the additional references added do not cure what appellant perceived was deficient in the combined teachings of Cohen and Frauenglass et al. As noted above, the arguments presented regarding the combination of Cohen and Frauenglass et al have not been found to be persuasive. As such, the

appellant's arguments regarding these grounds of rejection have not been found persuasive. The appellant is additionally advised in this regard that the reference to Melbye (the Fifth Ground of rejection identified by appellant) clearly suggested that one skilled in the art would have fabricated the fastener component itself from thermoplastic material. As such, and with the inclusion of the thermoplastic and thermosetting resin mixture as a coating upon the fastener as provided from by the combined teachings of Cohen and Frauenglass et al, the entire fastener itself would have been fabricated from thermoplastic and thermosetting resin materials (as noted above). Thus, appellant's arguments that Frauenglass et al only provided a coating of the material for preapplication to the fastener prior to use is not persuasive as the entire fastener in this combination of references was clearly made from thermoplastic and thermosetting materials.

Lastly, appellant did not reply to the above identified Eighth to Eleventh Grounds of Rejection identified in the Final Rejection and discussed above. As such, it is believed that appellant agrees with the interpretation of the additionally applied references but instead finds fault with the combination of Cohen and Frauenglass et al. As discussed above, it is believed that the combination of Cohen and Frauenglass et al provided a substantial prima facie case of obviousness and therefore it is believed that these grounds of rejection should be sustained.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

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JHA
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